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Multigate *pico*

Der einfache Zugang zu
Fahrzeug-Bussystemen

Bedienungsanleitung

User's manual

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1 Description Multigate *pico*

The Multigate testing devices of ACR-automotive provide easy and cost-saving access to all kinds of automobile bus connections (CAN, SCI, LWL). In basic configuration they are efficient means for testing and diagnosis and additionally may be programmed individually. Therefore the Multigate series is suitable for development and testing of control devices and the use during the whole production process.

The Multigate *pico* is the smallest device within the Multigate series. It is a transparent interface converter between serial single- and dual-wiring buses of vehicles (SCI) and serial communication port (RS-232) of PCs. Thereby the Multigate *pico* fulfills or surpasses standards of the most important automobile manufacturers to assure a valuable investment.

Focal points during the development of Multigate *pico* were easy handling, mechanic and electrical robustness as well as flexible areas of operation.

2 Installation and Test

Install the Multigate *pico* as follows:

1. Set jumpers according to the type of bus (single- or dual-wiring) and to the need of pull-up resistor.
2. Connect Multigate *pico* via vehicle connecting cable to the car bus . Because the power is supplied via the car bus, the LED *Power On* should be lit now.
3. Connect Multigate *pico* to PC's serial interface (com port).
4. Start program *MultiTest*.

ELO –18
✍
car bus

D-Sub 9pin
✍
PC (COM-port)

Power ON	Power supply ok.
SCI-RXD	Receiving data
SCI-TXD	Transmitting data
Status	Status of clamp 15 / R

3 Program MultiTest

Using the supplied software, you can easily check connections and configuration of your experiments. Furthermore it provides basic functions for sending and receiving bus telegrams.

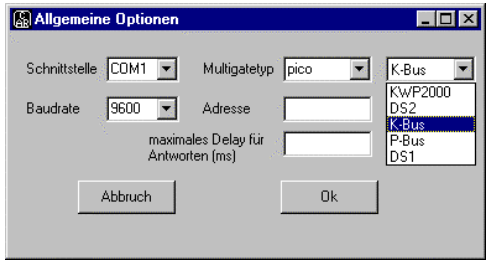
3.1 Installation of Software

1. Create a new directory on your computer.
2. Copy all data from the supplied disk into this directory.

3.2 Start and Configuration

1. Start the program by executing *multitest.exe*
2. Open the configuration menu at *Einstellungen / Allgemein (= configuration / general)*

This window appears:



Set *Schnittstelle (= port)* and *Baudrate (=baudrate)* to the desired values and make sure that *Multigatetyp (= type of multigate)* is set to "*pico*".

The drop down field *Protokoll (= protocol)* defines the protocol for telegrams. These choices are available:

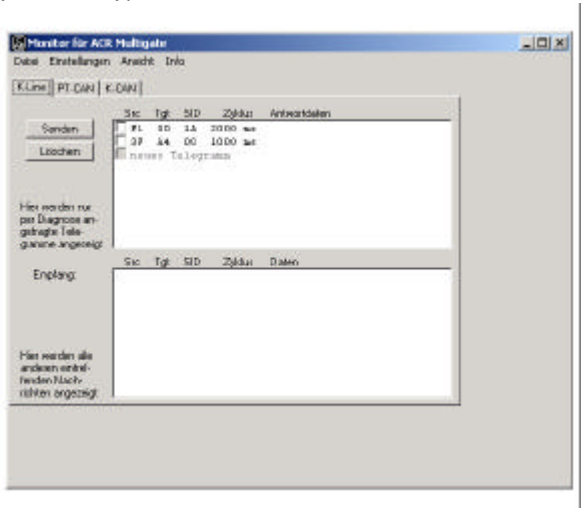
- KWP2000
- K-Bus
- DS2
- P-Bus
- DS1

While using Multigate *pico*, the attached PC controls data transparently, therefore the setting of *Adresse (=address)* is ignored. Using other Multigate devices, communication between Multigate and PC is handled by using KWP2000 and *Adresse (=address)* as Multigate address. The device only forwards selected telegrams to the PC.

Using the Multigate *pico*, the task of filtering and sorting is done by the software MultiTest according to the settings of the windows.

3.3 Sending and Receiving of Telegrams

Multigate *pico* only uses bus type “K-Line”. Data is sent and received in the main window:



Outgoing telegrams are sent continuously with the set *Zykluszeit (=cycle time)* once the checkbox is activated. Outgoing telegrams with cycle time = 0 can not be activated. For sending, they must first be selected by mouse and then the sending button pressed.

Incoming telegrams are assigned to outgoing telegrams, if possible. The telegram must be received within a set *Antwortzeit (=response time)* and sender / receiver must be exchanged. In this case received data is shown aside sent data in the send window.

If an incoming telegram can’t be assigned to an outgoing telegram, it is written into the receive window. If an identical telegram exists, it will be overwritten if the checkbox is activated. This checkbox also controls writing into the log window.

For example, in case of a periodic bus signal “speed”, the actual values can be read at a fixed position.

3.4 Definition of Telegram Parameters

Definitions of outgoing and incoming telegrams are set at *Einstellungen / Senden (=configuration / send)* and *Einstellungen / Empfangen (=configuration / receive).* Alternatively the definition can de accessed by double-clicking onto the according telegram in the send or receive window:

Outgoing Telegrams

Depending on the protocol, set parameters are used for assembling valid telegrams. Specific particularities depending on the bus type:

- DS1 und DS2 ignore field *Source.*
- All three PBUS-data bytes are written into the field *Daten*.
- At DS1, DS2 und KBUS *Service ID* corresponds to "Commandbyte“.

Incoming Telegrams

Set parameters are treated as selectors: A telegram is recognized if *source*, *target* and *service-ID* match set parameters.

3.5 Log Window

All sent and received data is written into the log window . Telegrams are listed with time stamps.
Interesting for users is the point that telegrams of all activated buses are logged. Therefore a Multigate *mini* already is capable of monitoring gateway functionality.

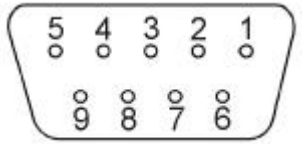
By activating the checkbox *Einfrieren (=freeze)* the actual content of the window is fixed.

3.6 Program Information

This window shows program version and phone number of ACR-hotline for technical inquiries:

4 Connectors

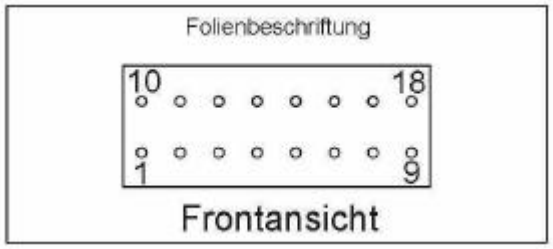
4.1 D-Sub Connector



Front View

Pin	Color	Signal name	Remark
1	green	logical 0	ON ≙ +12V
2	yellow	RxD	Data output to PC
3	brown	TxD	Data input from PC
4	N.C.	not connected	not connected
5	black	GND	GND
6	red	Status of clamp15 / R	ON ≙ -12V OFF ≙ +12V
7	N.C.	not connected	not connected
8	green	logical 0	ON ≙ +12V
9	green	logical 0	ON ≙ +12V

4.2 ELO-18 Connector



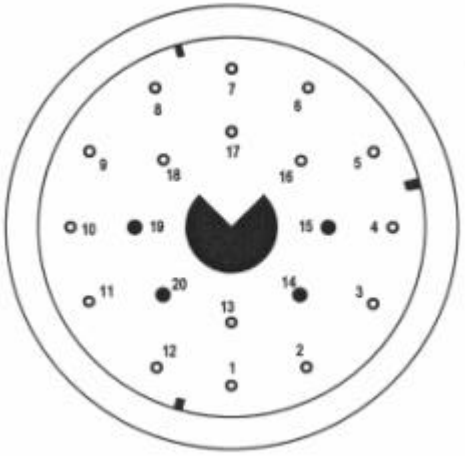
Front view

Pin	Color	Signal name	Remark
1	red	KL. 30	
2	orange	KL. 15 / R	
3	black	KL. 31	
4		KL. 31	Diag GND
5	yellow*	Diag RxD / TxD *	
6	green*	Diag TxD *	
7		not connected	
8		not connected	
9		not connected	
10		not connected	
11		not connected	
12		KL. 31	Not in use with pico
13		KL. 31	Not in use with pico
14		not connected	
15		not connected	
16		KL. 31	
17	brown	not connected	
18		not connected	

*) Single wiring: Pin 5, Pin 6 ✍ TxD

Dual wiring: Pin 5 ✍ RxD
Pin 6 ✍ TxD

4.3 Diagnosis Connector



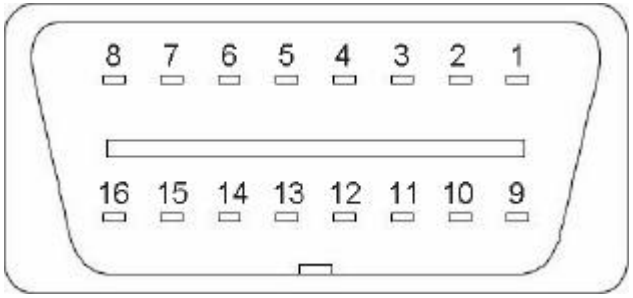
View from car onto contacts

Pin	Signal name
14	clamp 30
15	Data In
19	clamp 31
20	Data Out

WARNING:

The wiring is not standardized. There is no liability for damages.

4.4 OBD2 Connector



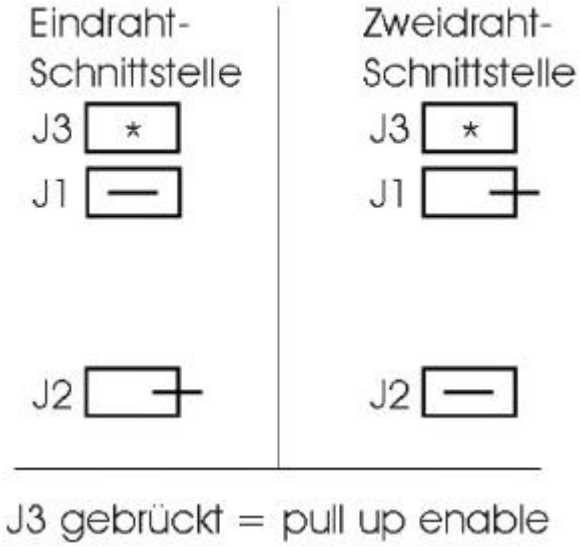
Front view

Pin	Color	Signal name
1	orange	clamp 15
4	black	clamp 31
5	black	clamp 31
7	yellow	diag RXD/TXD
8	green	diag TXD
9	brown	engine (N)
16	red	clamp 30

WARNING:

The wiring is not standardized. There is no liability for damages.

5 Jumpers



Eindrahtschnittstelle = Single-wiring
Zweidrahtschnittstelle = Dual-wiring
Closed J3 = Pull Up enabled

6 Appendix

6.1 Supplied Items

Scope of Supply:

1 x Multigate pico
1 x PC connecting cable with SUB-D connector
1 x Vehicle connecting cable
1 x Test software
1 x User's manual

Connector for vehicle:

The vehicle connecting cable is supplied with open wires. On request it will be equipped with one of these connectors:

- ?? OBD-II
- ?? BMW diagnosis connector
- ?? D-Sub (pin-compatible with CAD-electronic level transformer)
- ?? Custom-specific connectors

Extras

Magnetic holder (Snap-In)
Screw joint (Snap-In)
Rubber stand

6.2 Technical Data, General

Supported Buses and Protocols	ISO 9141 KWP2000, BMW-KWP2000*, BMW-fast BMW K-Bus, I-Bus, P-Bus diagnosis bus DS2, DS1
Additional Protocols	Unrestricted (PC-controlled)
Max. Baudrate	at least 125 kBd
Power Supply	via vehicle (6 – 35 Volts), transient protected, protection against disorientation, low power consumption, sleepmode capable
Display	LEDs for monitoring bus activity and power supply
Housing	Stroke protected plastics, IP 52 Size 125mm x 65mm x 30mm (L x W x H)
Temperature (Storage, Operation)	Industrial range, -40°C to +85°C

6.3 Technical Data, Bus Connection

Modes	Single or dual wiring (selectable by jumper)
Resistance	switchable pull-up-resistor: 510 Ohm, +/- 1% (for 12 V-version, 24 V-version on request)
Input capacity	< 0.3 nF
Transmitter level	logical „Zero“: < 10% V_B, max. 100 mA logical „One“: > 90% V_B max. output voltage range 0 V to V_B permanent shortcut protection
Slew rate (Transmitter)	risetime < 10% bit duration falltime < 10% bit duration (each between 10% and 90% of signal amplitude @ max. 125 KBd)
Receiver level	logical „Zero“: max. 35% V_B logical „One“: min. 65% V_B
Handshake	signal of vehicle connecting cable (clamp 15) is provided at DSR-Pin of PC connecting cable